Securing Water for southwest Missouri's Future

While 70% of Las Vegas water goes for landscaping and Americans use about 100 gallons of water at home each day, those in the world's poorest nations subsist on 5.

In 15 years, 1.8 billion people will live in regions of severe water scarcity.

A well in India.

Women in developing countries walk an average of 3.7 miles to get water. These women in Kenya spend up to 5 hours a day carrying water.

46% of people on earth do not have water piped to their homes

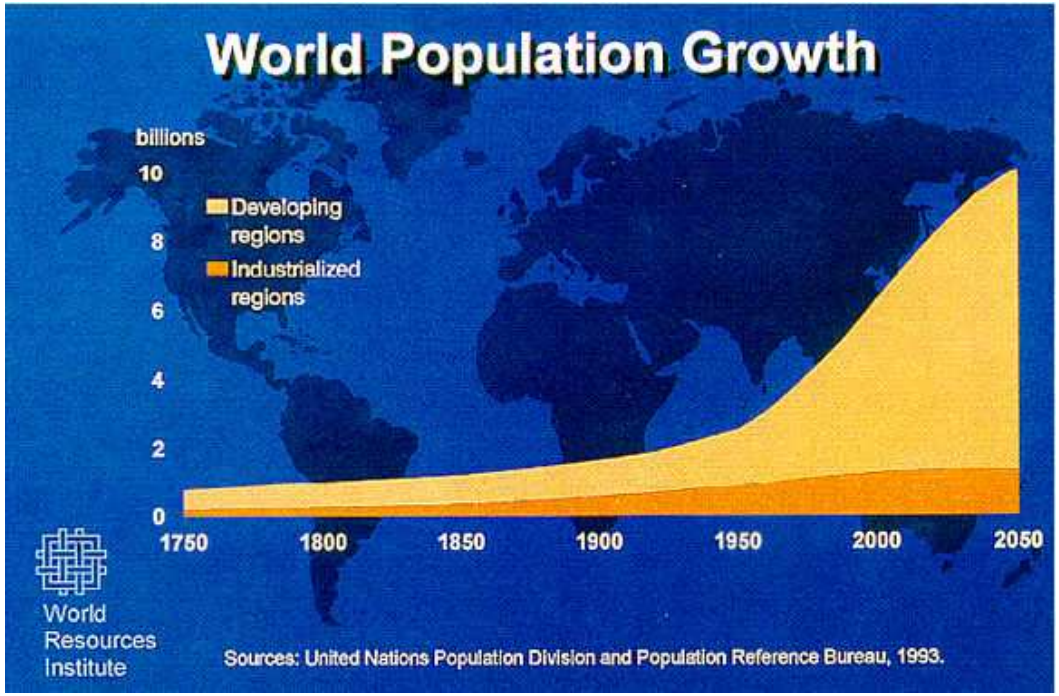
A billion people on the planet do not have access to clean water

National Geographic, Water: Our Thirsty World

- Two and a half billion people live without access to clean water and adequate sanitation

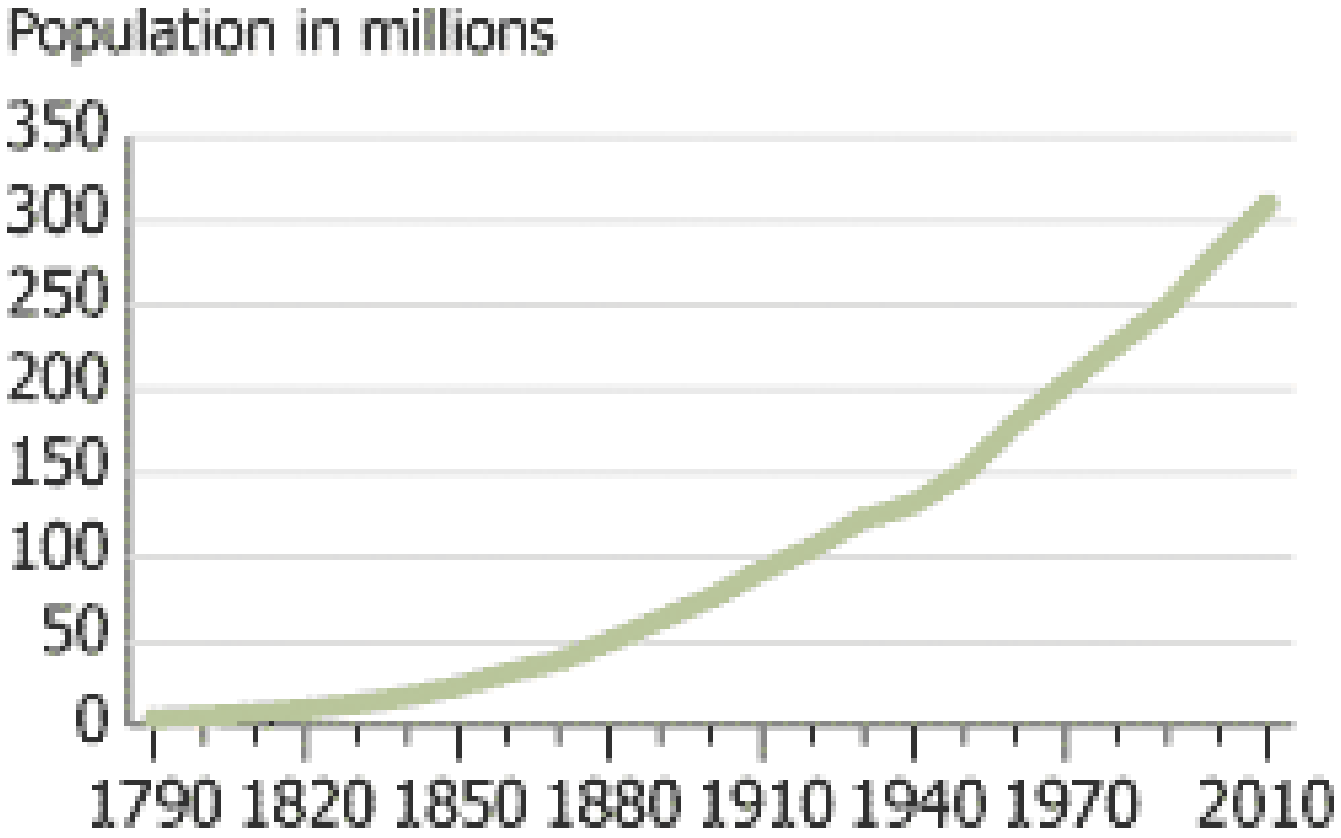
- Every minute a child dies of a water related disease





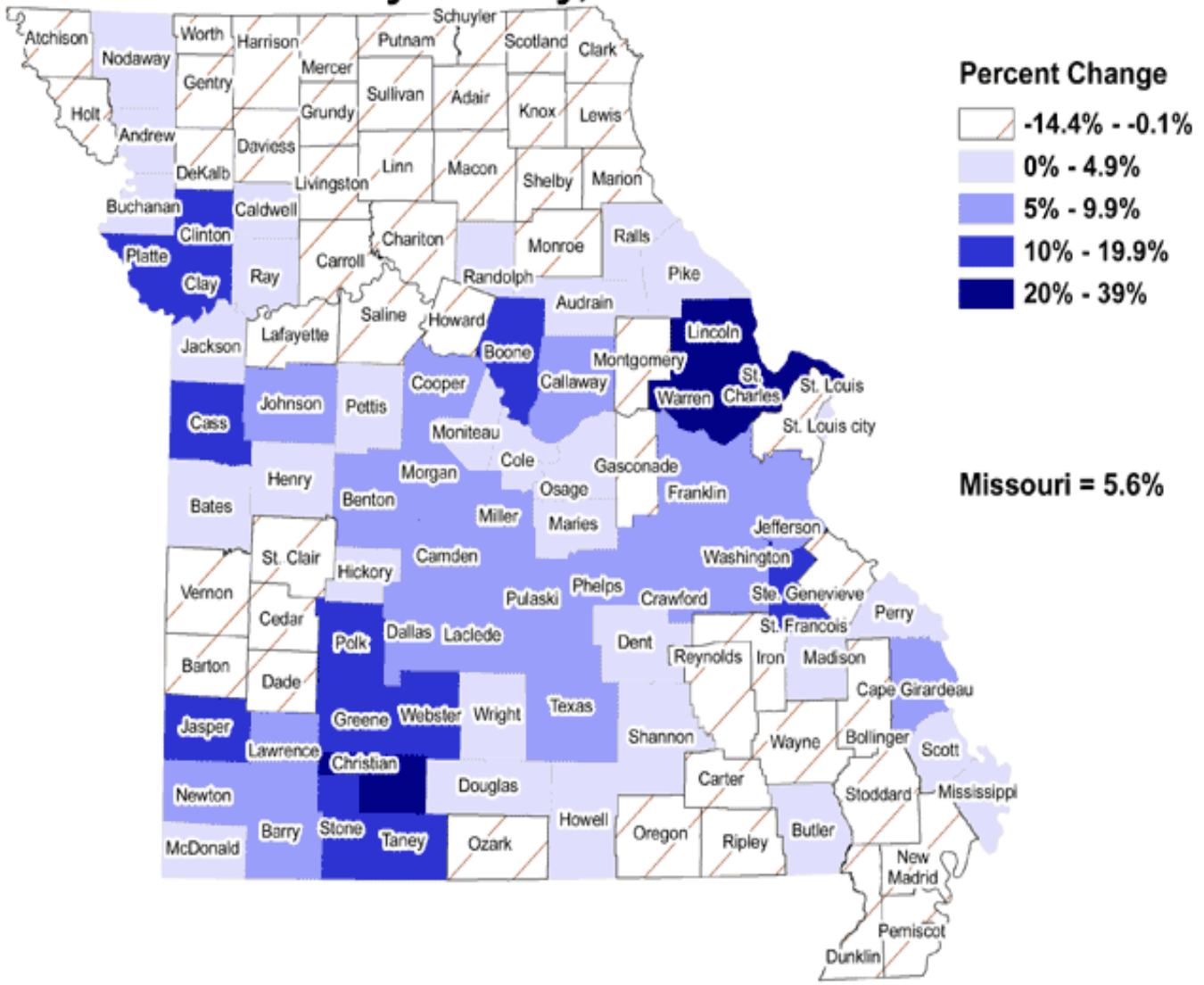
Two-thirds of our water is used to grow food. With 83 million more people on earth each year, water demand will keep going up unless we change how we use it.

U.S. Resident Population, Decennial Censuses, 1790–2010.

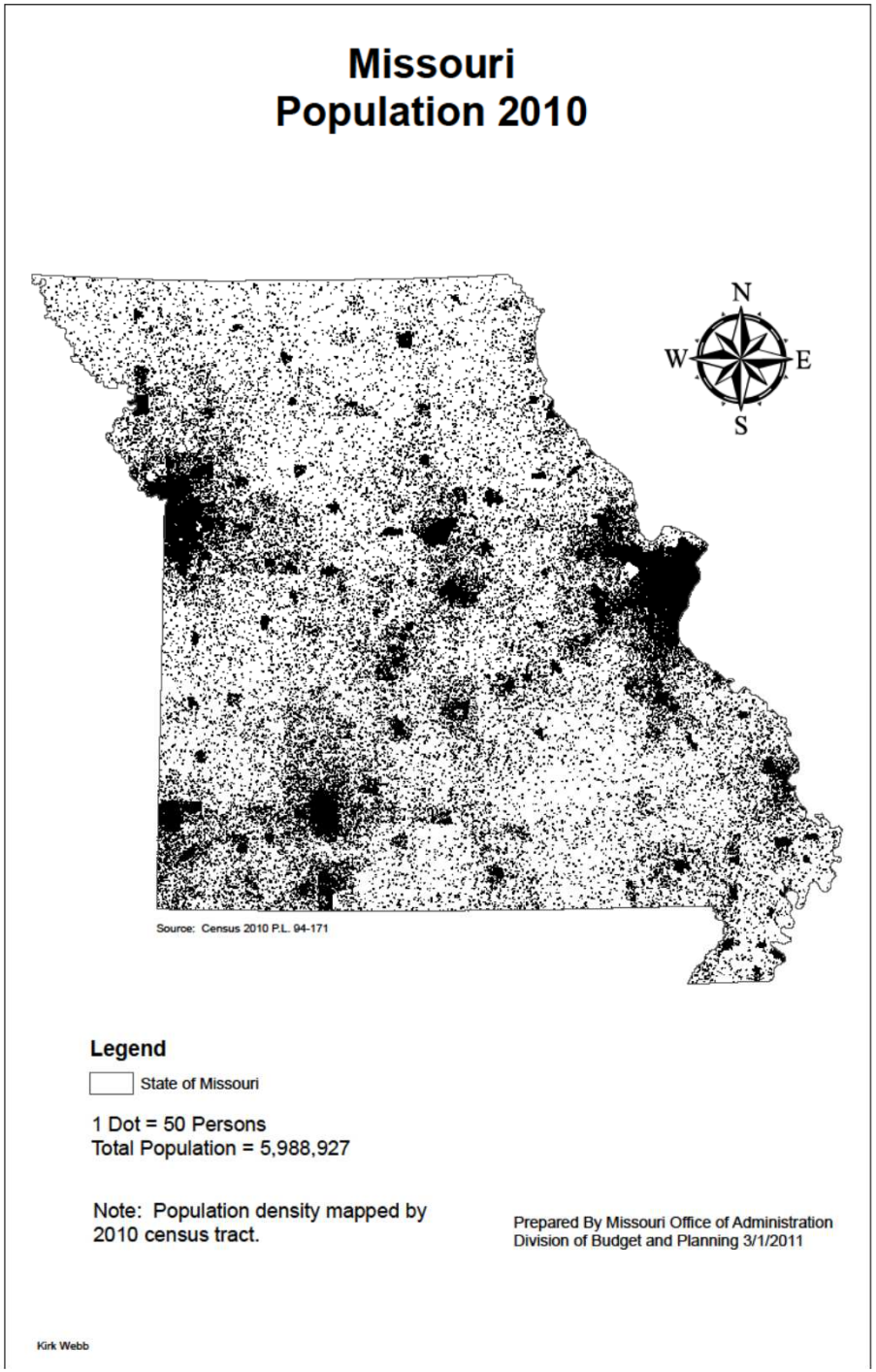


Source: U.S. Census Bureau.

Percent Change in Missouri Population by County, 2000-2008

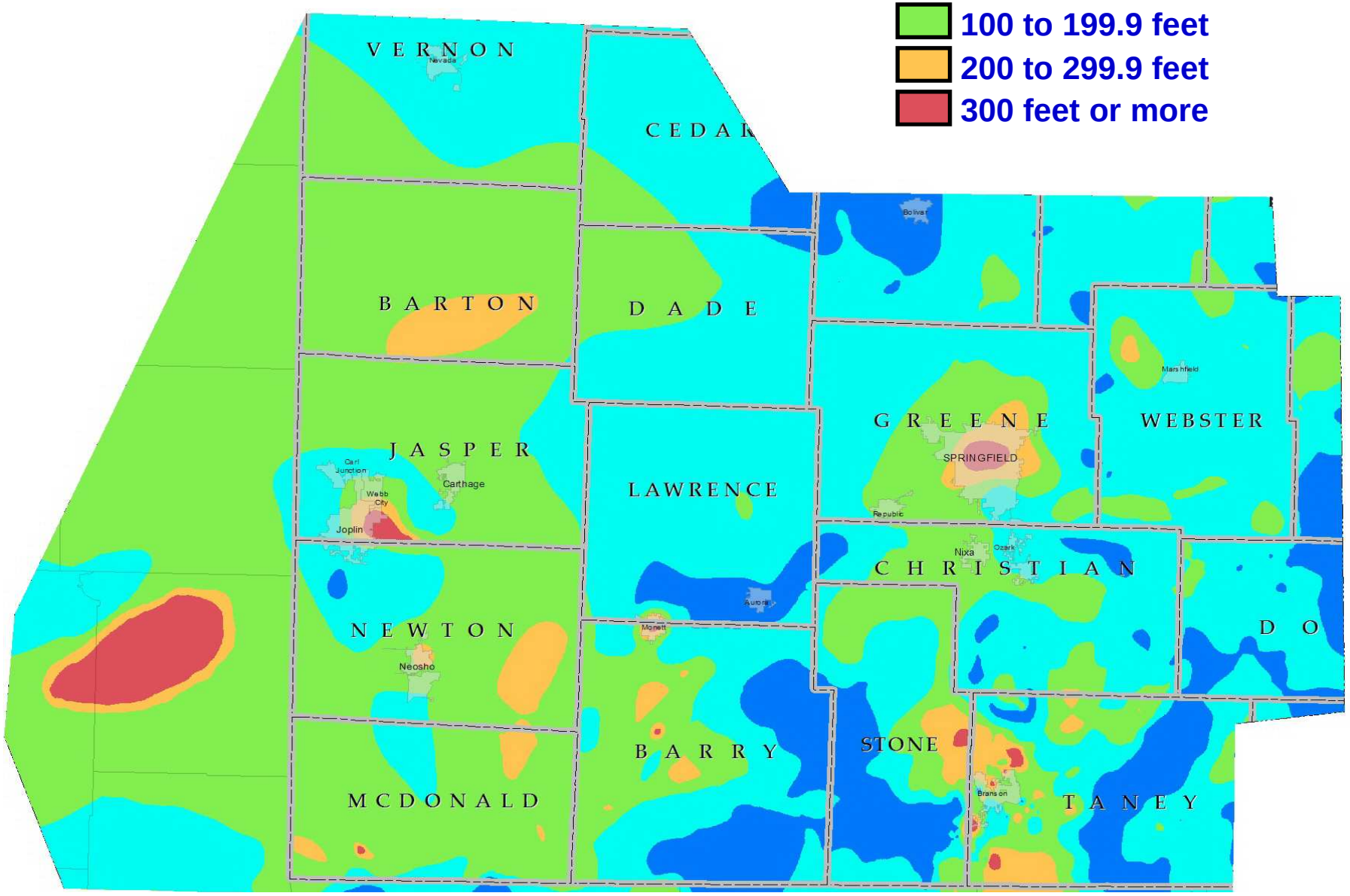


Source: USDC, Bureau of the Census, Federal State Cooperative for Population Estimates, 2008
Prepared by: University of Missouri Extension, Office of Social and Economic Data Analysis (OSEDA)
Map Generated on: 02 Apr 2009



Population densities stress water supplies

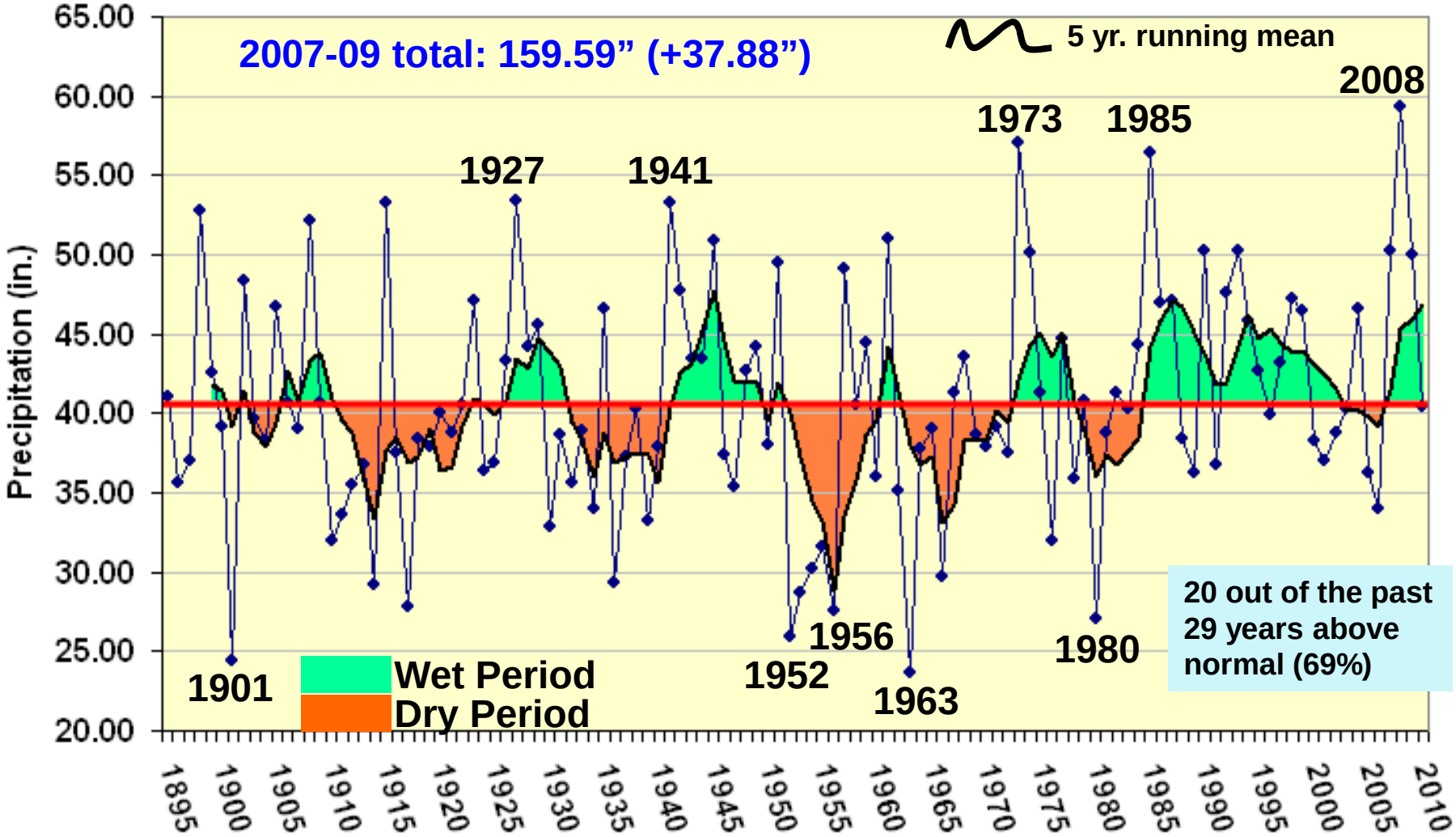
GROUNDWATER LEVEL DECLINE FROM PREDEVELOPMENT TO 2006-2007



Source: Mo DNR, Water Resources Center

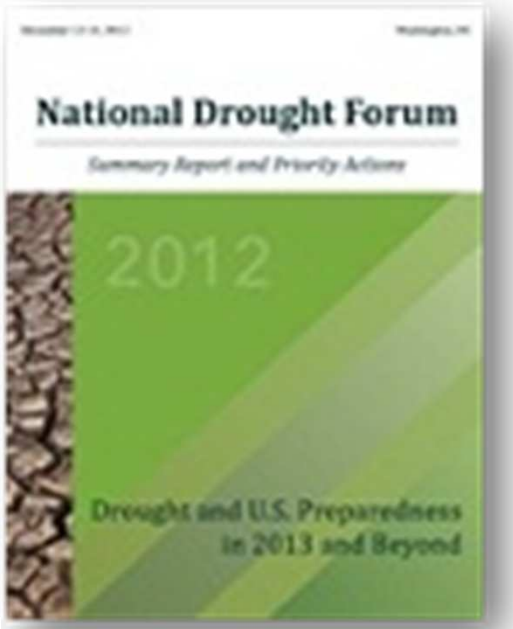
Annual Average Precipitation (1895-2010)

Long-term average: 40.57 in.



Missouri Climate Center/MRCC

DROUGHT 2012



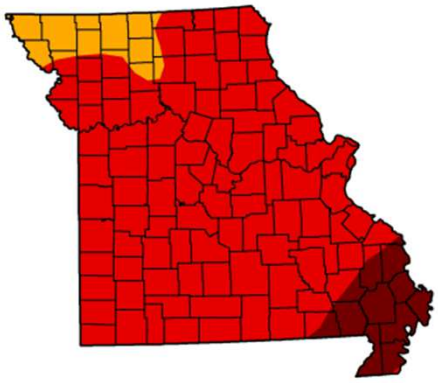
U.S. Drought Monitor

Missouri

July 31, 2012
Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	100.00	92.79	8.40
Last Week (07/24/2012 map)	0.00	100.00	100.00	100.00	68.86	8.09
3 Months Ago (05/01/2012 map)	83.81	16.19	0.00	0.00	0.00	0.00
Start of Calendar Year (12/27/2011 map)	95.48	4.52	0.00	0.00	0.00	0.00
Start of Water Year (09/27/2011 map)	55.19	44.81	22.45	8.65	0.00	0.00
One Year Ago (07/26/2011 map)	50.75	49.25	6.16	0.00	0.00	0.00



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu

USDA

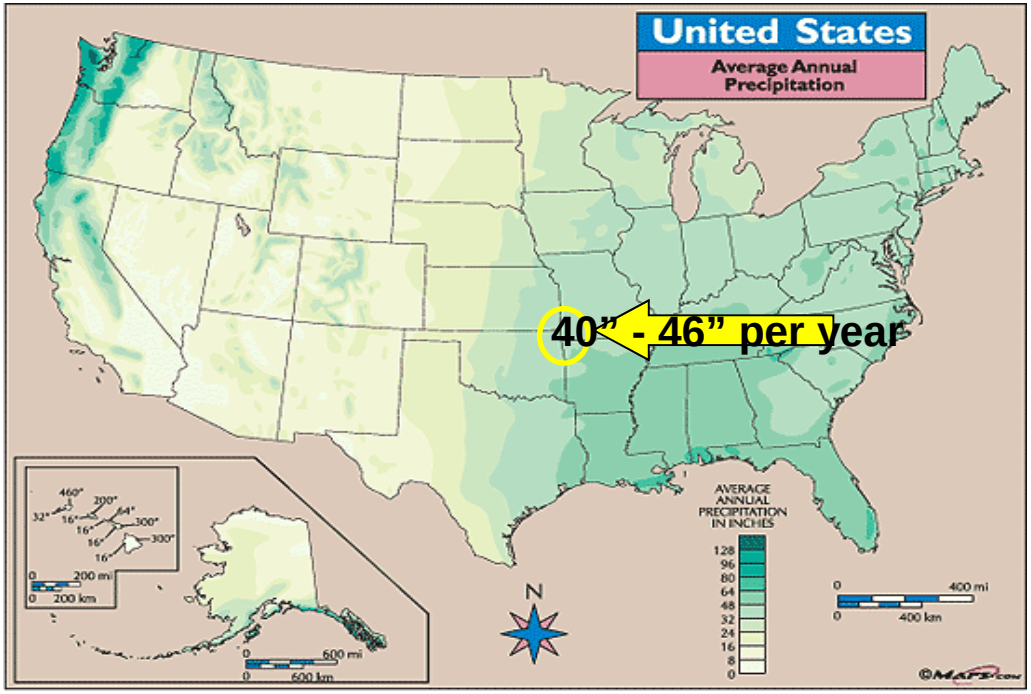
Released Thursday, August 2, 2012
Mark Svoboda, National Drought Mitigation Center

[U.S. Drought Portal
www.drought.gov]

Decaying infrastructure: Nearly every American city west of the Appalachian Mountains is at the age where the original infrastructure is now badly in need of repair/replacement. The east coast cities went through this in the 60′s.

A USA TODAY study of residential water rates over the past 12 years finds that crumbling infrastructure is forcing repairs from coast to coast, with costs more than doubling in 1 of 4 localities.

Riparian / Reasonable Use
vs.
Prior Appropriation



Water is not priced to reflect its value

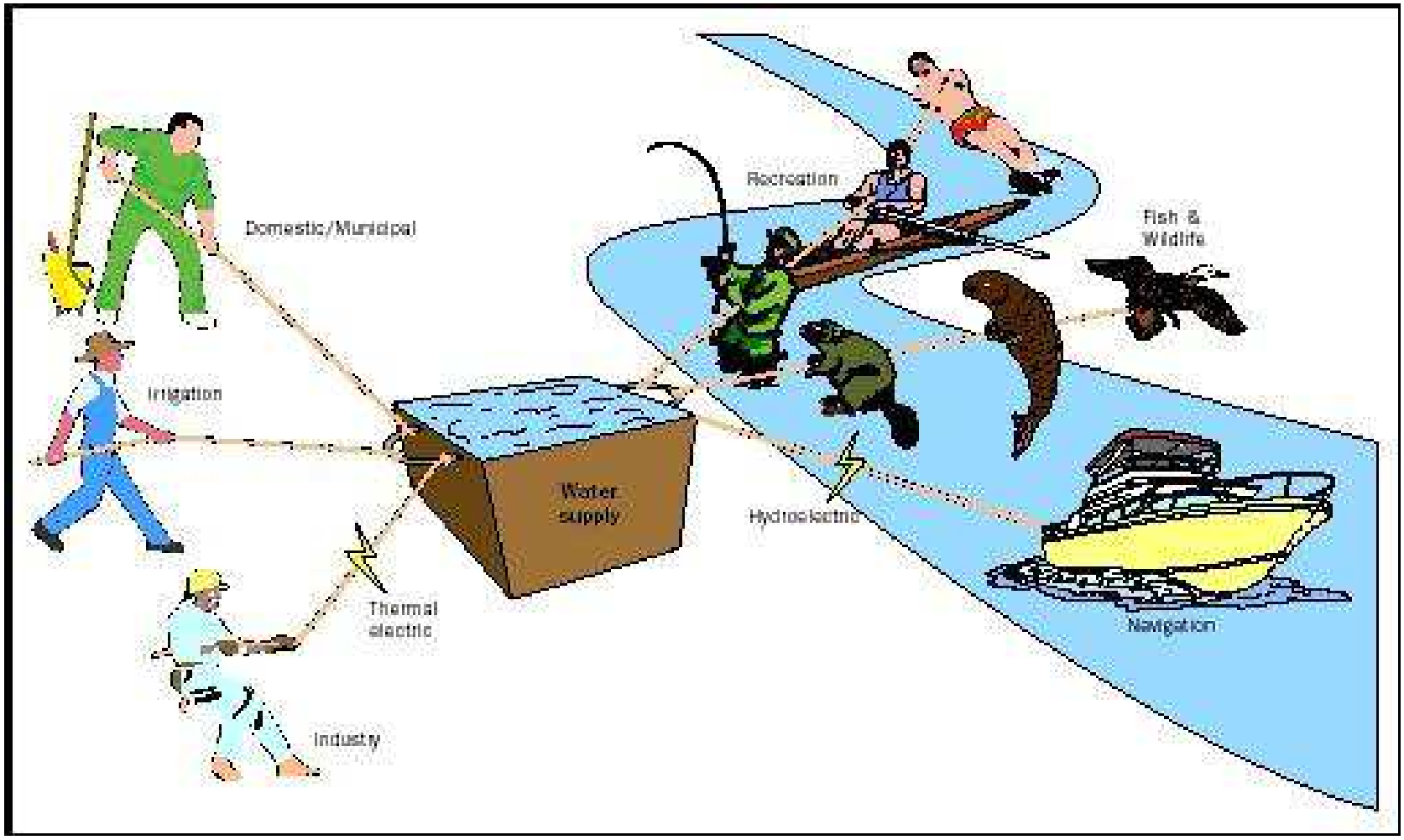
Average pool is ~20,000 Gallons
Pool full of **topsoil** (bags) cu ft $2.64 = **$7,057**
Pool full of **gasoline** at $3.29 = **$65,800**
Pool full of **milk** at $4 per gallon = **$80,000**
Pool full of **perfume** at 1 oz/$29 is 1 gal/$3,712 = **$74,240,000**
Pool full of **water** (in Cassville) at $.0033 per gallon = $65 + $11 (base) = **$76**
($3.25 per 1,000 gallons)

Excess

Sustainability

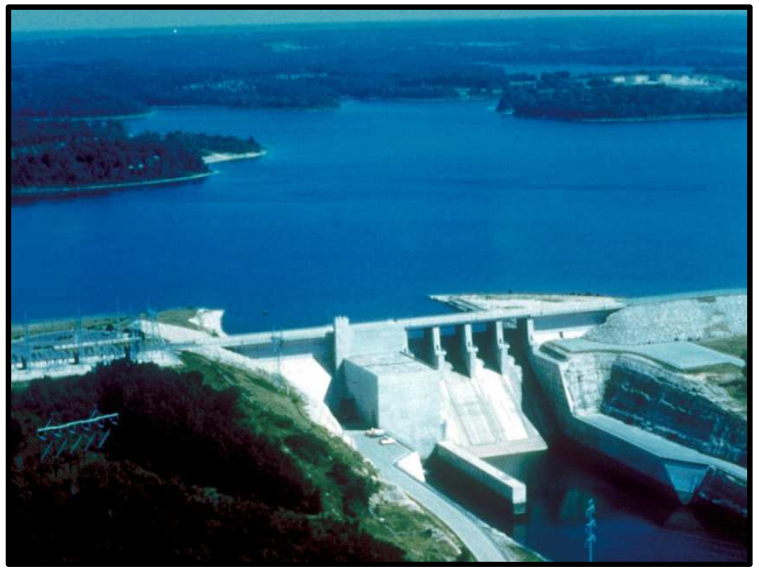

We Do Not Inherit the Earth from Our Ancestors; We Borrow It from Our Children

Competing Uses for Water Supply



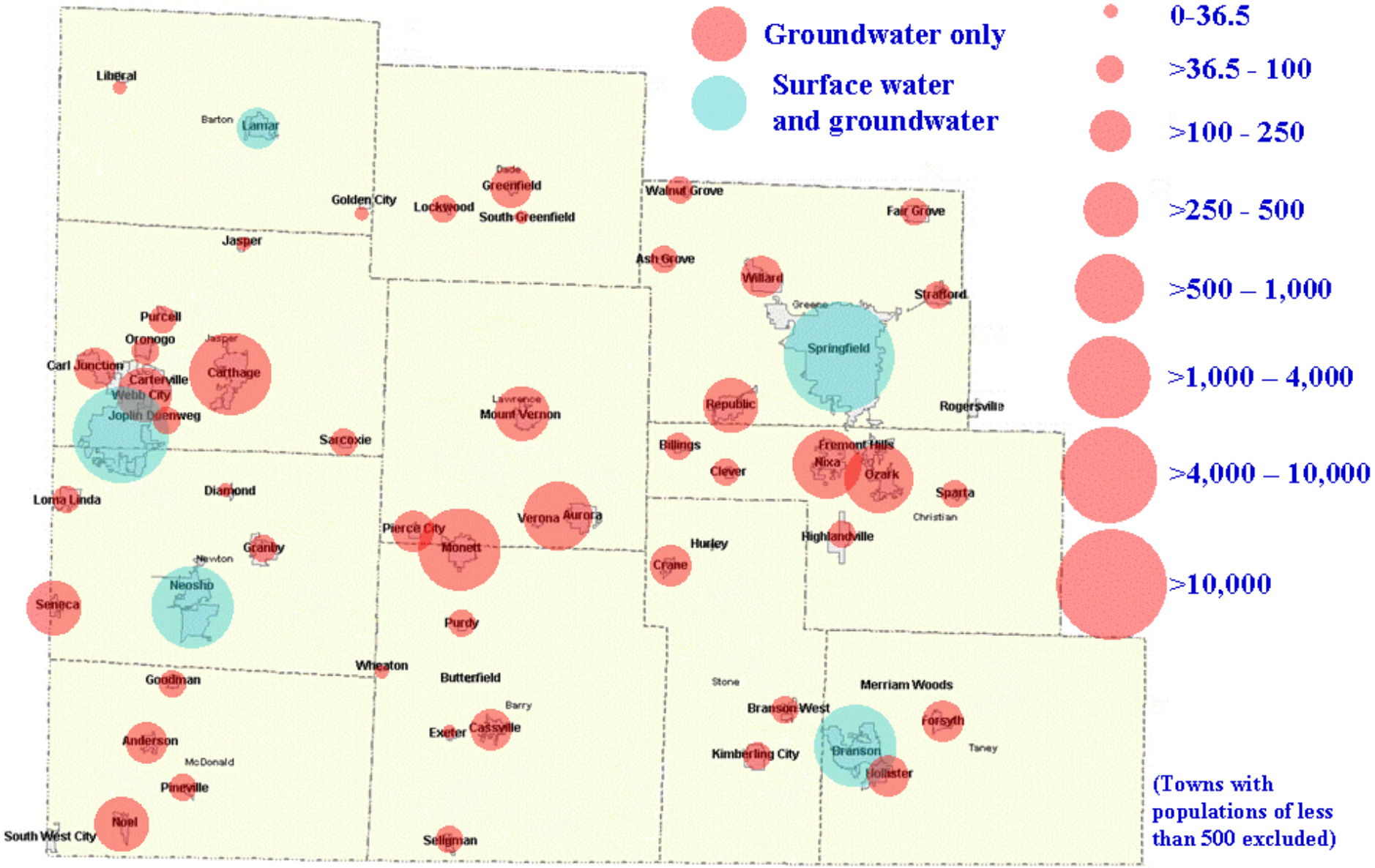
Where does Missouri's water come from?

- Surface (Rivers, lakes) – 62%
  - 54% from Missouri River
    - 8 of 10 biggest cities
  - 7% other surface
  - 1% Mississippi
  - Flow limited



- Ground (aquifers) – 38%
  - High quality water
  - Abundant but …
    - Cones of depression
    - Well interference
    - Cost of pumping
    - Saltwater intrusion
    - Contamination
    - Subsidance
    - Dependent on re-charge

Average Annual Municipal Water Use 1996 – 2008
(million gallons per year)



Missouri Water Supply - Regional solutions beyond the Missouri River

Long-term water supply development for nearly 1 million Missourians

Plans developed in partnership with water commissions and federal agencies and other partners

- Clarence Cannon Wholesale Water Commission – Mark Twain Lake
  14 county / 15 cities and 9 rural water districts
- Atchison County Wholesale Water Commission
  1 county / Three cities and one rural water district
- Great Northwest Wholesale Water Commission
  12 county region
- North Central Missouri Regional Water Commission
  10 county region

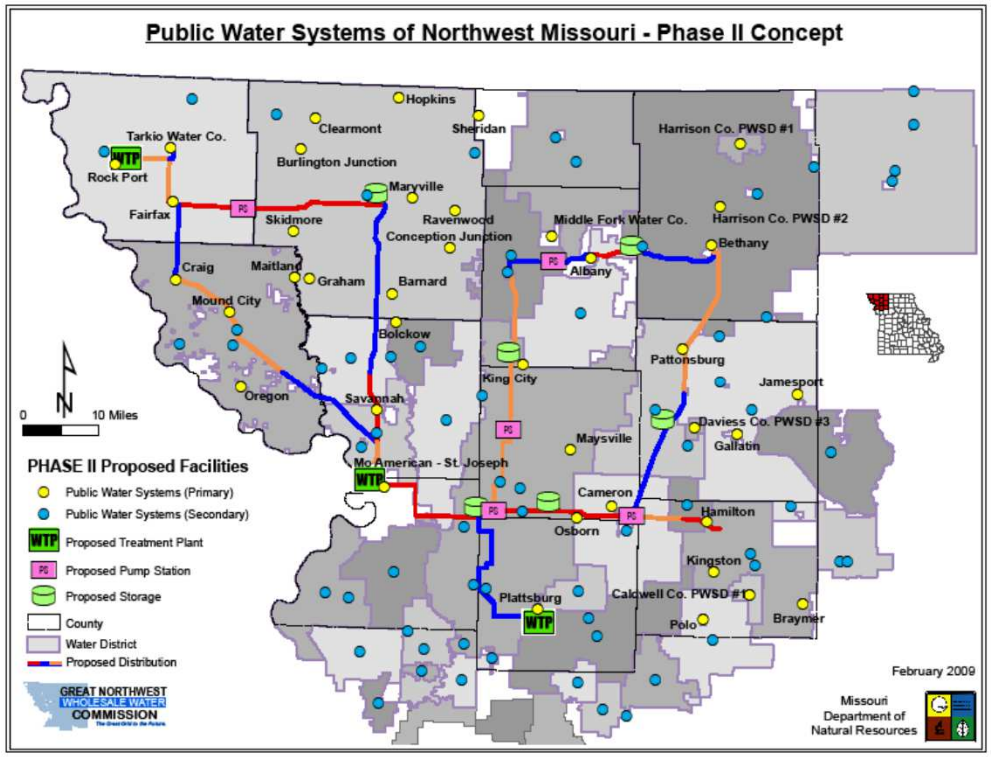
Tri-State Water…

16 county region

Mark Twain Lake – Northeast Missouri

- Contract for water 20,000 ac. ft. of water supply storage
- Clarence Cannon WWC currently serves nearly 70,000
- Provides future water supply assurance for portions of NE and Eastern MO

Northwest Missouri Water Supply Project

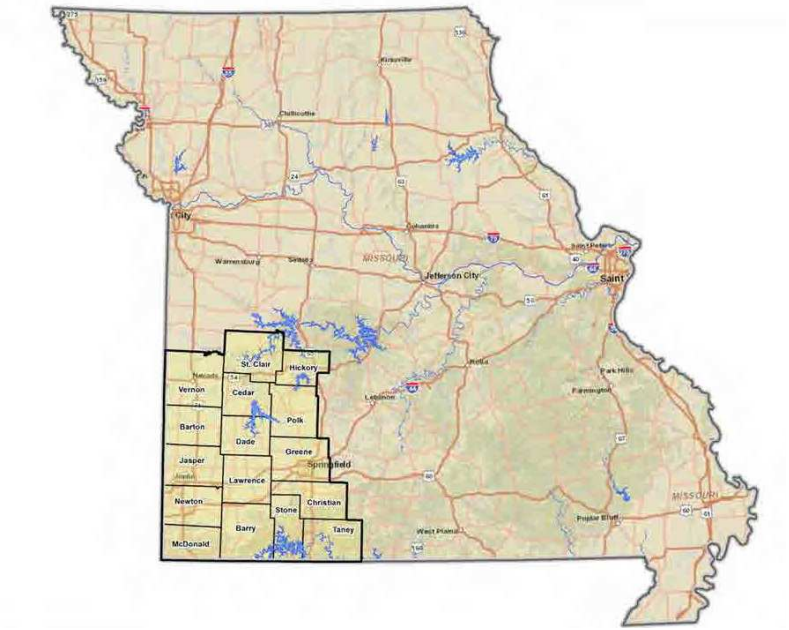


After examining 39 water systems in the region, WPNWMO found that only 11 had an estimated lifespan of 15 years or more, and many have already outlived their useful life, which could mean costly repairs or having to purchase treated water from other sources. With the new grid system, counties will have the option to join GNWWC, which is working with the state and national governments to establish funding for the grid that is to be built in five phases.

TRI-STATE WATER

Resource Coalition

Securing Water for Southwest Missouri's Future



TRI-STATE WATER

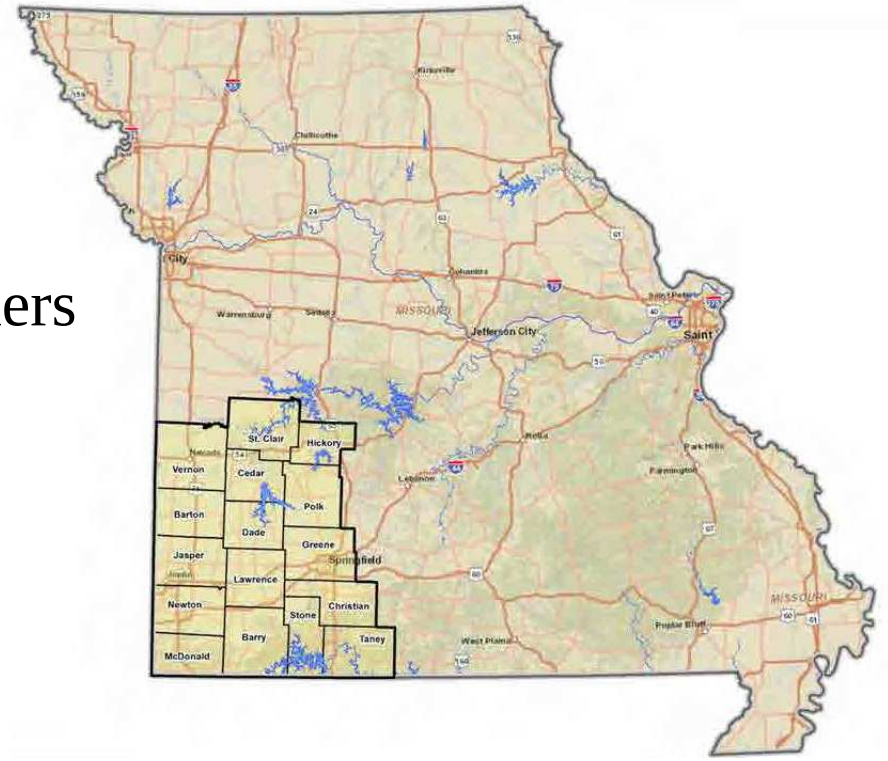
Resource Coalition

Our Footprint covers 16 counties

Membership Includes:

- Cities
- Counties
- Public and private water providers

Our mission is to ensure adequate, affordable long-term water supplies for southwest Missouri

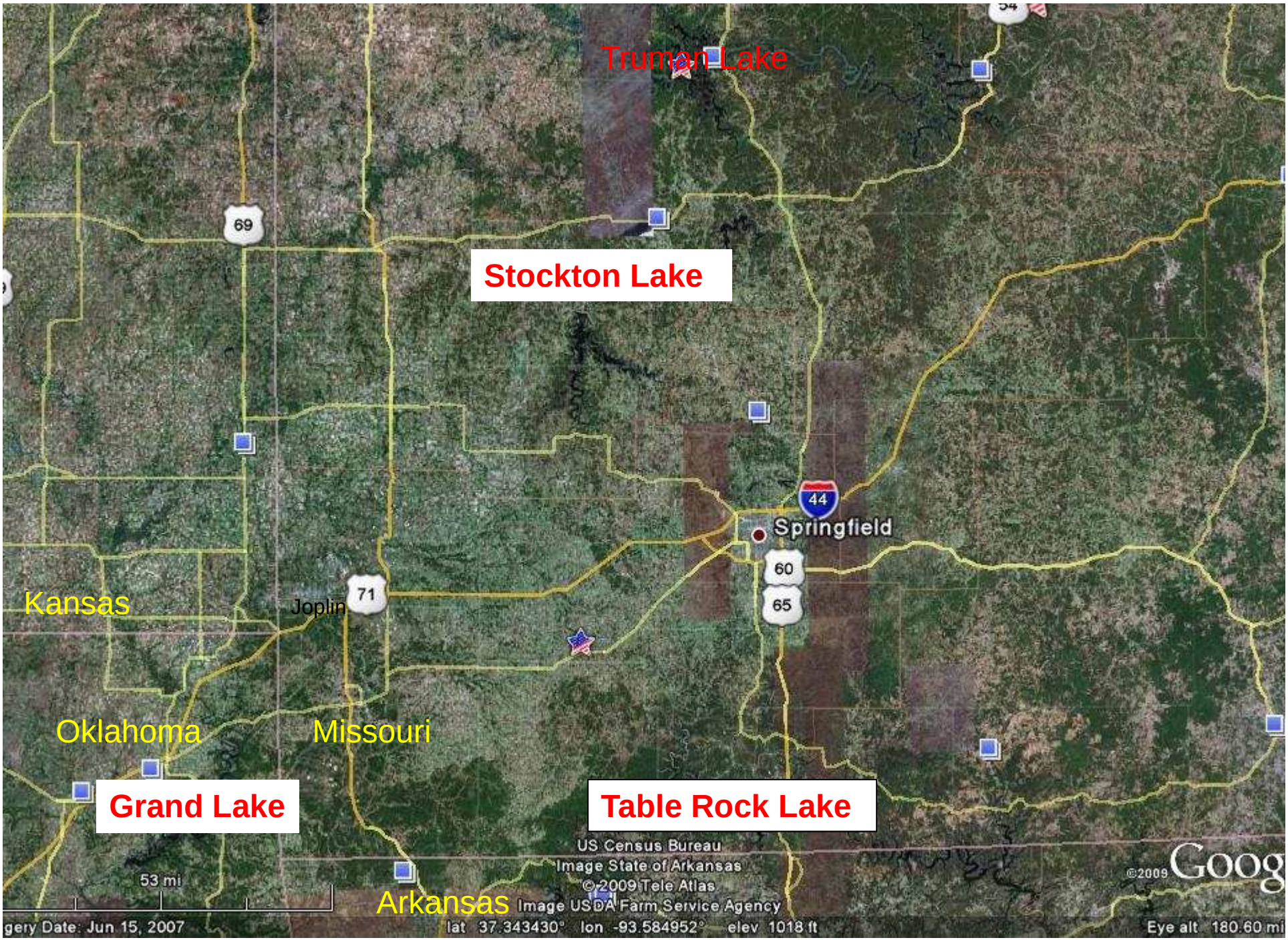


TRI-STATE WATER
Resource Coalition

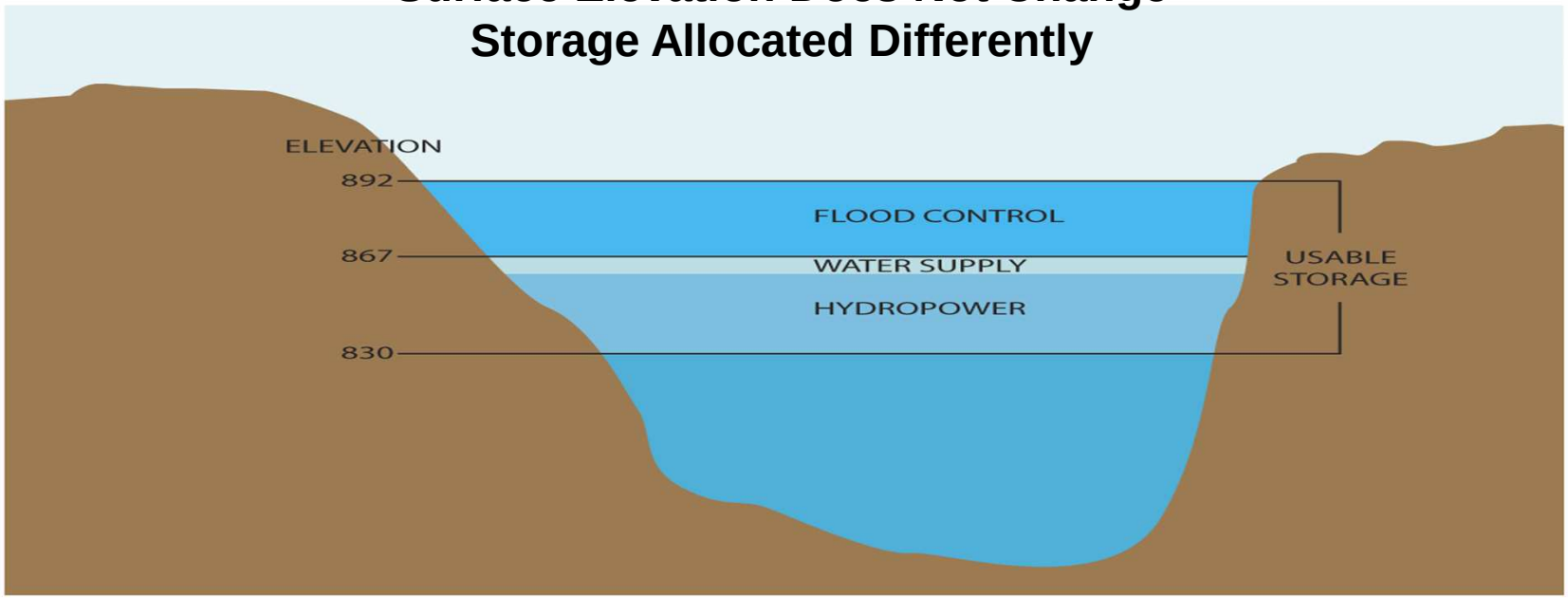
- Joplin Hydro Study (Wittman)
- Water Supply Study (Black & Veatch)
- Reservoir Site Screening (Freese & Nichols)
- Supplemental Reservoir Study (Freese & Nichols)
- Report Summary (TSWRC)
- Missouri Water Resource Study – Phase I (CDM)
- Missouri Water Resource Study – Phase II (CDM)
- Missouri Water Resource Study – Phase III (CDM)
- Stockton Lake Reallocation Study

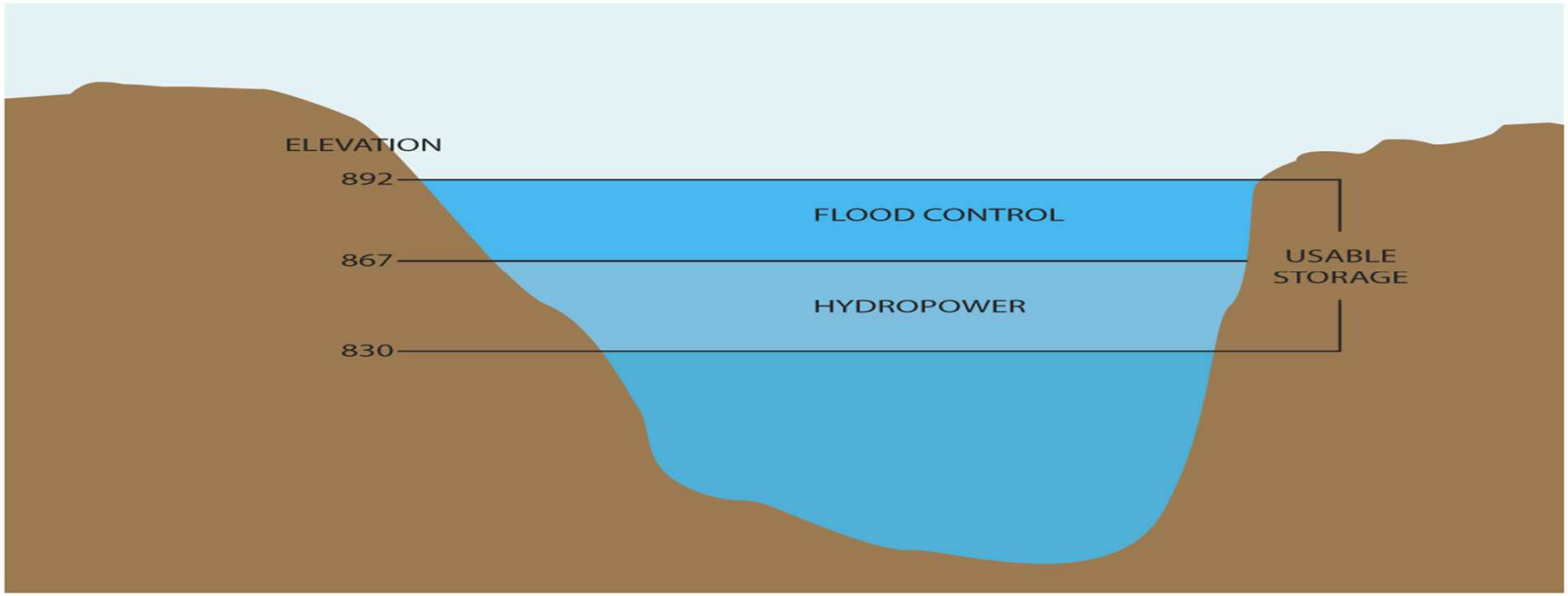
Available online as .pdf files

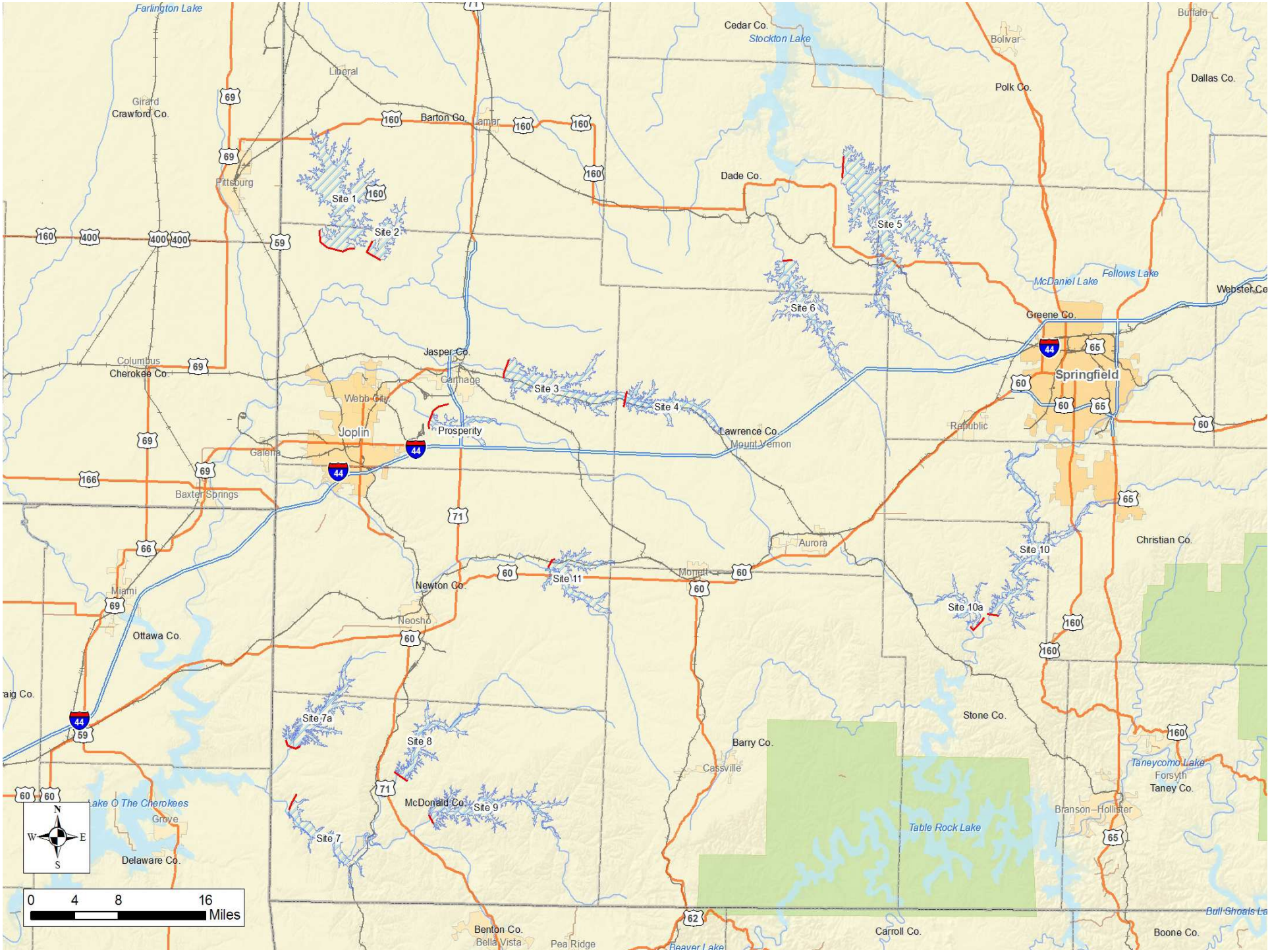
www.tristatewater.org


Truman Lake
Stockton Lake
69
44
Springfield
60
65
71
Joplin
Kansas
Oklahoma
Missouri
Grand Lake
Table Rock Lake
Arkansas
US Census Bureau
Image State of Arkansas
©2009 Tele Atlas
Image USDA Farm Service Agency
53 mi
gery Date: Jun 15, 2007
lat 37.343430° lon -93.584952° elev 1018 ft
Eye alt 180.60 mi
©2009 Goog

Surface Elevation Does Not Change
Storage Allocated Differently






Farlington Lake
Girard
Crawford Co.
Liberal
Barton Co.
Lamar
Pittsburg
Site 1
Site 2
Cedar Co.
Stockton Lake
Bolivar
Polk Co.
Buffalo
Dallas Co.
Dade Co.
Site 5
Site 6
McDaniel Lake
Fellows Lake
Webster Co
Greene Co.
Springfield
Columbus
Cherokee Co.
Jasper Co.
Carthage
Webb City
Joplin
Prosperity
Site 3
Site 4
Lawrence Co.
Mount Vernon
Republic
Galena
Baxter Springs
Aurora
Site 10
Christian Co.
Miami
Ottawa Co.
Newton Co.
Site 11
Monett
Site 10a
Neosho
Site 7a
Site 8
Site 9
Site 7
McDonald Co.
Stone Co.
Barry Co.
Cassville
Taneycomo Lake
Forsyth
Taney Co.
Branson–Hollister
Table Rock Lake
Grove
Delaware Co.
Benton Co.
Bella Vista
Pea Ridge
Carroll Co.
Boone Co.
Bull Shoals La
Beaver Lake
N
W
E
S
0 4 8 16
Miles

TRI-STATE WATER
Resource Coalition

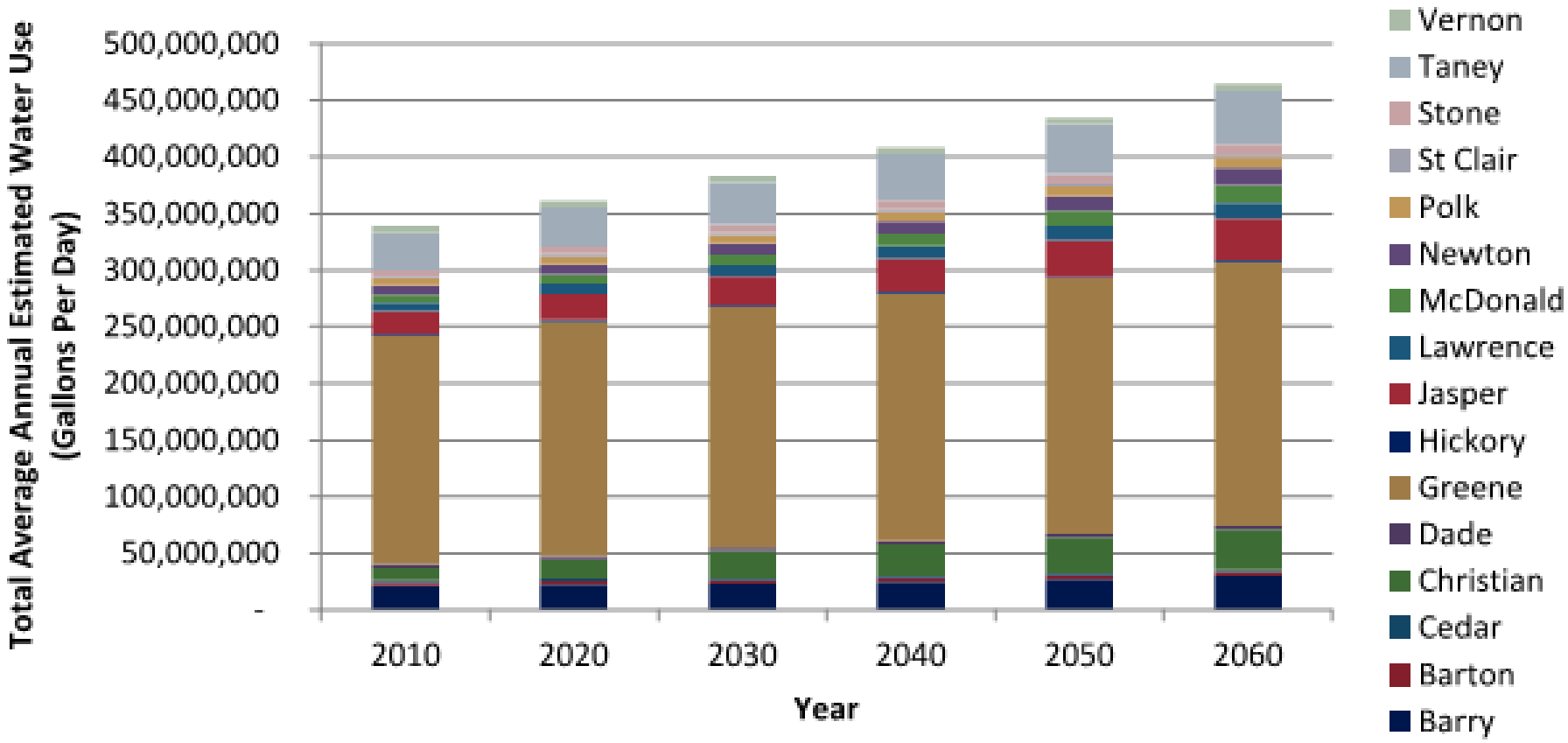
Southwest Missouri Water Resource Study – Phase I: Forcast of Regional Water Demands 2010 – 2060 (CDM) – September 2012 (Revised November 2012)

Estimated S.W. Missouri Baseline and Projected Average Water Demands to 2060 (GPD)*

YEAR	HIGH GROWTH	MEDIUM GROWTH	LOW GROWTH
2010**	338,503,791	338,326,175	338,326,175
2030	414,026,845	382,615,101	358,502,024
2060	581,735,120	462,337,386	387,226,057
% INCREASE	**71.9%**	**36.7%**	**14.5%**

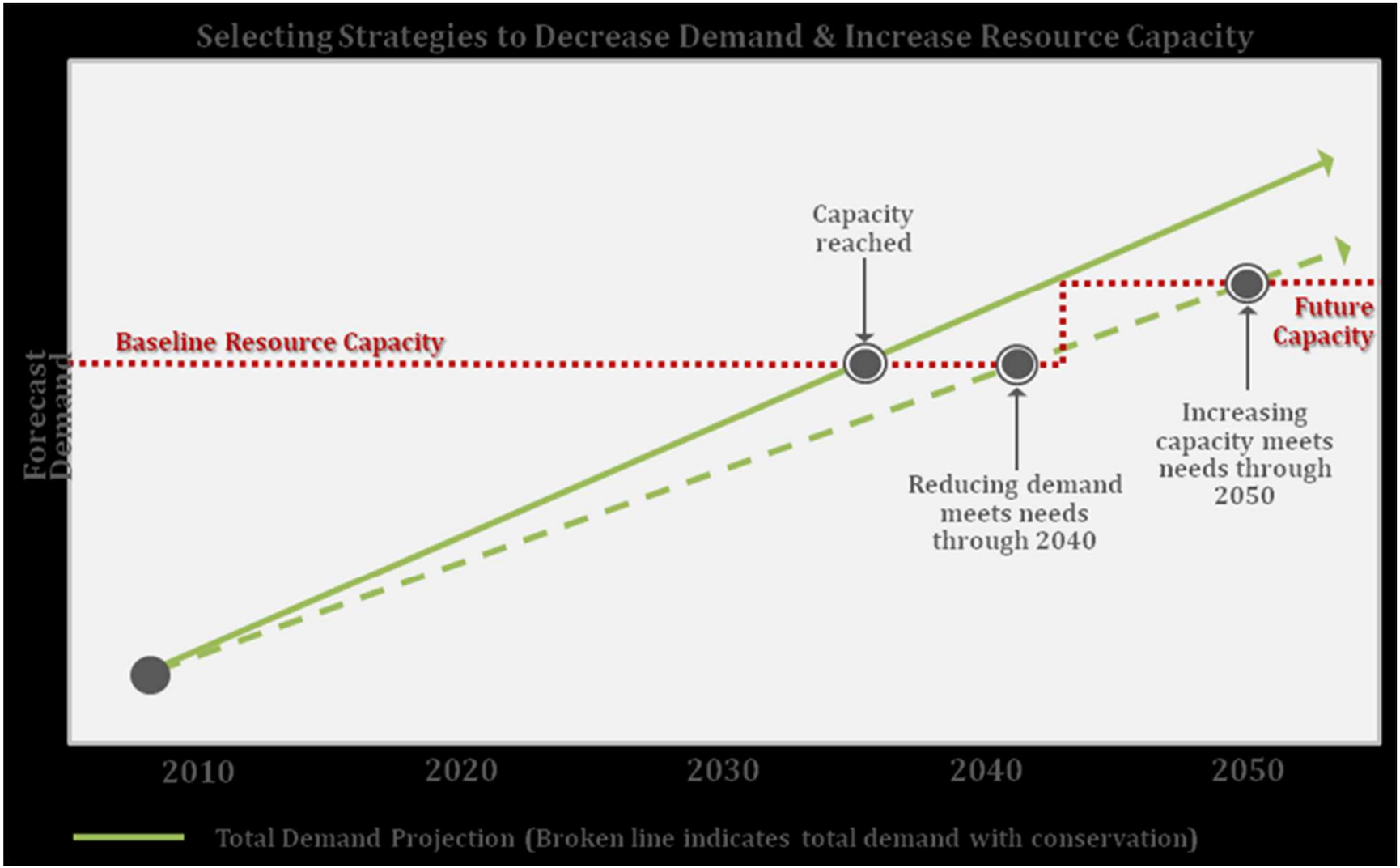
Under baseline conditions, that is, with no additional conservation measures, estimated system-wide demand under the medium growth scenario increases from 339.1 to 464.0 MGD, an increase of 36.8%. Water demand for the entire region is estimated to increase between 49.2 MGD and 245.0 MGD between 2010 and 2060, given the three different population growth scenarios. The total daily water demand in 2060 for the sixteen county region is estimated to grow to 388.3 MGD for the low growth scenario and up to 584.3 MGD for the high growth scenario.

Southwest Missouri Average Annual Estimated Water Use - Medium Growth Scenario

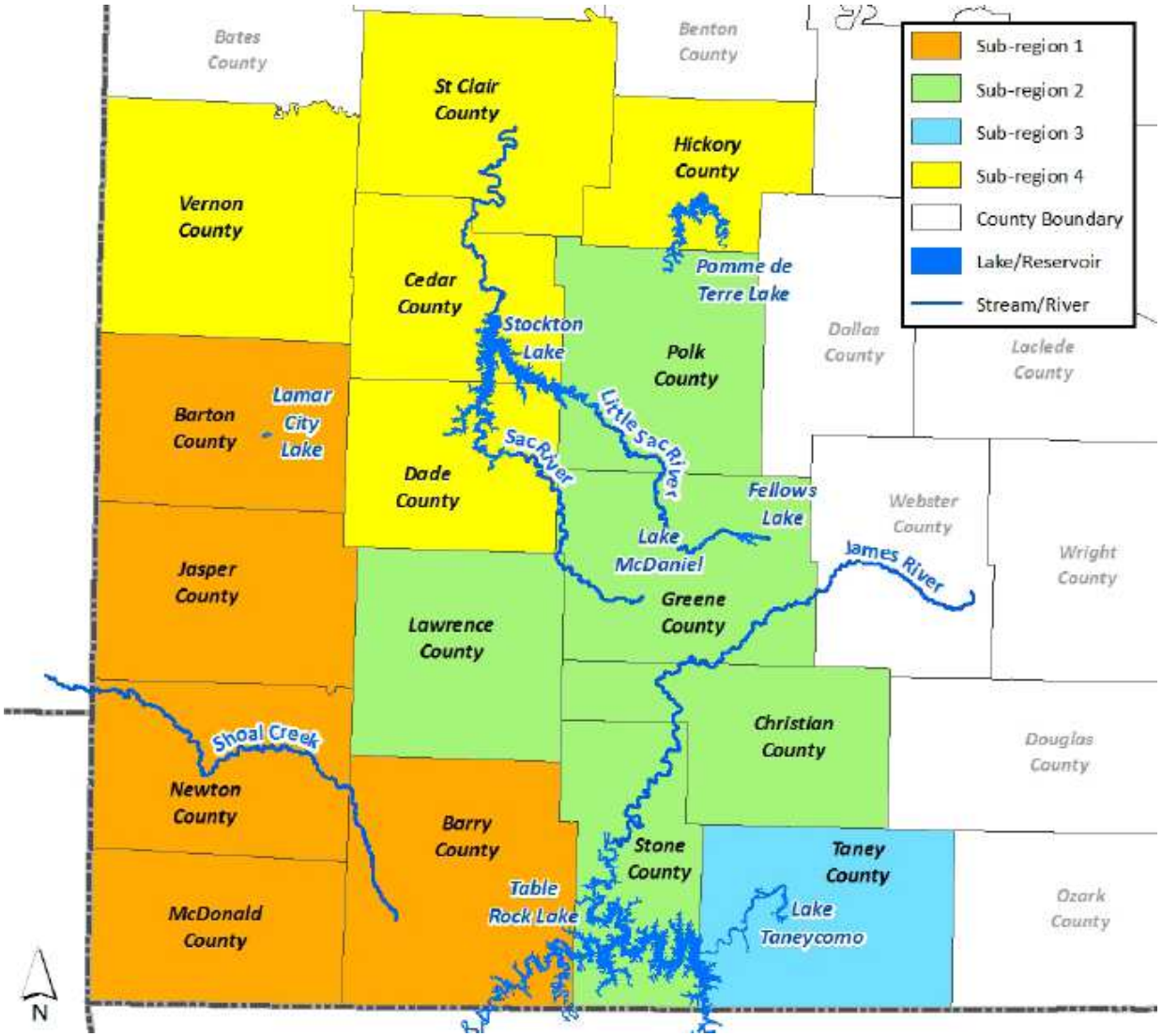


Reducing Demand with Conservation

Gap analysis: supply versus demand

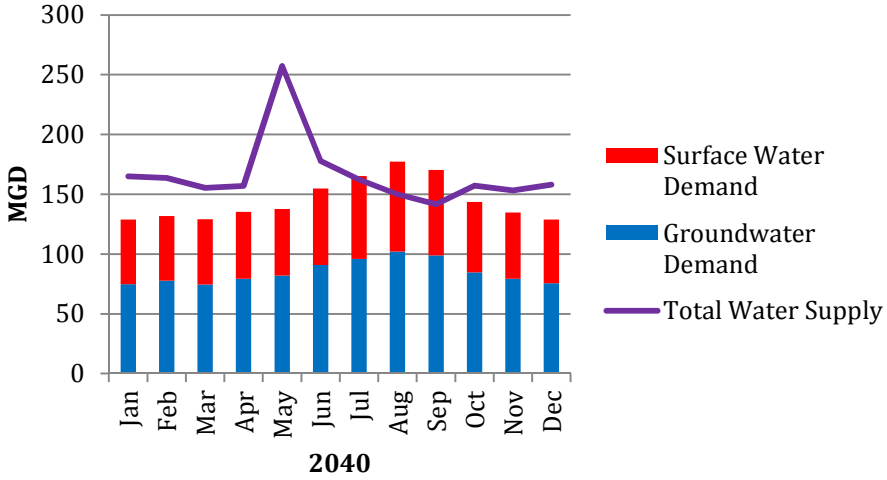


Sub-regions within our 16 county footprint



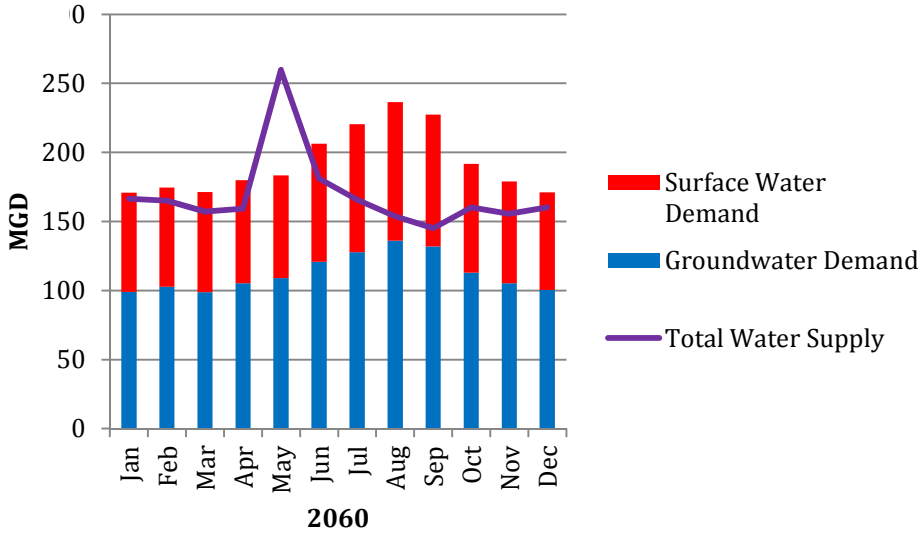
REGIONAL -16 County Total Supply Gap

Scenario 3



Drought Conditions

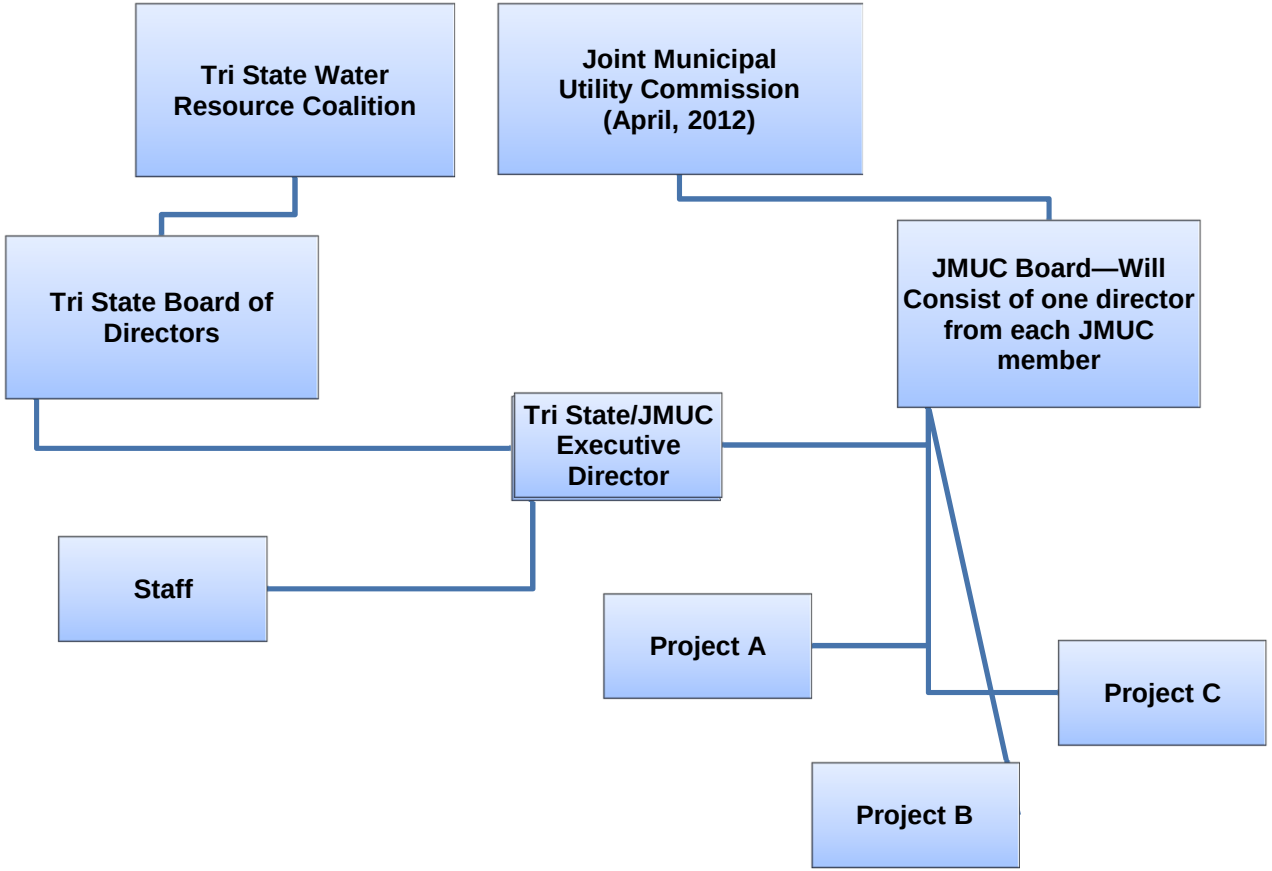
Scenario 3. Combined Gap 2040



Scenario 3. Combined Gap 2060

Building Additional Regional Water Infrastructure

The Southwest Missouri Joint Municipal Water Utility Commission



Project debt must be approved by the JMUC Board of Directors and by the governing body of all project participants.

Initially Staff and Dues for Tri State/JMUC will be one and the same

Joining the JMUC creates no obligation to participate in any future projects but provides the opportunity.

TRI-STATE WATER

Resource Coalition

Securing Water for Southwest Missouri's Future